MODULE

9

Plotly with Extra Plotly

"Objectives and assessments should serve as bookends of a lesson before the meat and potatoes are filled in."

- Christine, IMSA Professional Field Services

Introduction

Students learn plotly and use it for their projects. Facilitators introduce plotly, and guide them through the tool until they are comfortable, and then the facilitators give the students time to use their new skills to make fulfilling visualizations for their overarching projects.

Objectives

1. Students will be able to recognize what makes a good data visualization.
2. Students will be able to utilize Plotly to create visualizations.
3. Students will be able to improve their Plotly skills using what they learn in this module.
4. Students will be introduced to other data visualization tools.
5. Students will be able to use skills learned in this module to enhance their projects.

Agenda

1. Intro to Plotly
2. Getting Comfortable with Plotly
3. Work time

Activities

What Makes a Good Data Visualization

RESEARCH:

Source 1:

There are four important elements:

- Information
- Function
- Visual form
- Story

Source 2:

Give the viewer the greatest number of ideas, in the shortest time, with the least ink in the smallest space.

Source 3:

Less is more
(Visit the website https://www.e-nor.com/blog/data-visualization/makes-good-visualization to see a really good demonstration of this concept)

Source 4:

Three main things: Data analysis, story telling, design.
Perform good analysis on the data to see what you can take out of those numbers.
Storytelling makes it worthwhile for the readers to look at your visual.
Good design makes it easy for the reader to learn from the visual.

Source 5:

Use the right chart:

Area graph
Bar chart
Bubble chart
Candlestick chart
Histogram
Line graph
Marimekko/Mosiac Chart
Multi set Bar Chart
Population Pyramid
Radar Chart
Pie chart/donut chart
Scatterplot
Timeline
Venn diagram
Stacked Area Graph
Stacked Bar Graph
Heatmap
Nightingale Rose Chart

Choropleth map

Source 6: https://infogram.com/page/data-visualization

Purpose:

To show them how to make a good data visualization that will make a lasting impact (no pun intended)

Materials:

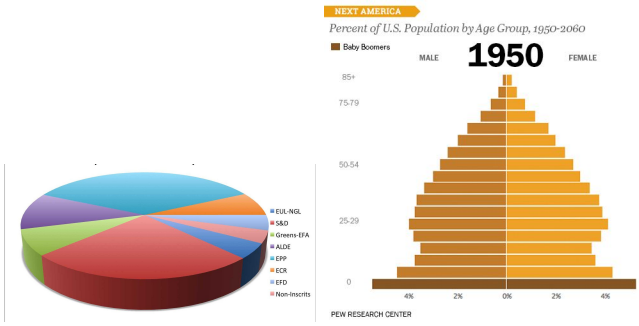
Projector

Their computers

Directions:

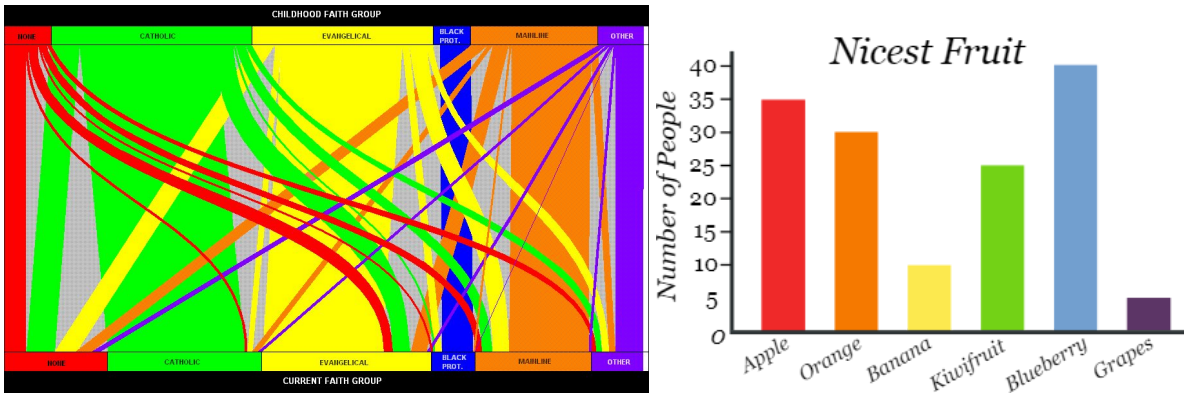
Explain to the students that there are three factors in a good graph: Functionality, Aesthetics, and Storytelling (do not explicitly explain outright why each factor is important - have a guided discussion on why these are important). For each one, introduce a graph that does it well, and one that doesn't, and ask the class for their input on why the graph works/doesn't work.

Functionality



Bad (left) - the red section seems the biggest, but in reality the blue section is
Good (right) - the two halves represent the two sexes, and there's no confusion as to what this graph conveys

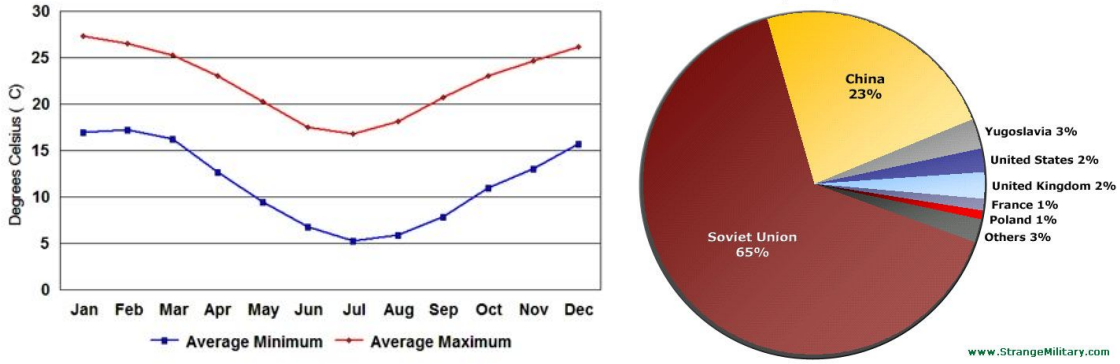
Aesthetics



Bad (left) - the colors are wayyy too bright, and this is just harsh on the eyes

Good (right) - there is color where it needs to be, and they also match with the fruit they represent
Visit the website https://www.e-nor.com/blog/data-visualization/makes-good-visualization to see a really good demonstration of the concept "less is more"

Enlightening



Bad (left) - the info that this graph presents is expected - the minimums are lower than the maximums, and the average temperatures change with the season. Who knew?
Good (right) - (assuming that your students aren't history buffs) this graph will come as a surprise to many, showing how the Soviet Union exploited large swaths of its population to try to overwhelm the enemy (instead of using better training and tactics)

Discussion:

1. (throughout the activity) Why are these factors important?
    a. Functionality - The visualization should be able to convey the right information to the reader. The prettiest data visualization won't matter if it does not correctly inform the reader. Functionality adds substance to the graphic.
    b. Aesthetics - Just like how writers use hooks to grab readers' attention, the data visualization has to be eye catching in order for it to be noticed. Aesthetics give the graphic more traction.
    c. Enlightening – A graphic can be functional and aesthetic but still may be lacking if the information is not utilized to change the reader's mind. If the graphic is not enlightening, then the viewing the graphic is only a waste of time.
2. Would there be any other essential features to a good data visual?
3.

Introduction to Plotly (30 minutes)

Purpose:

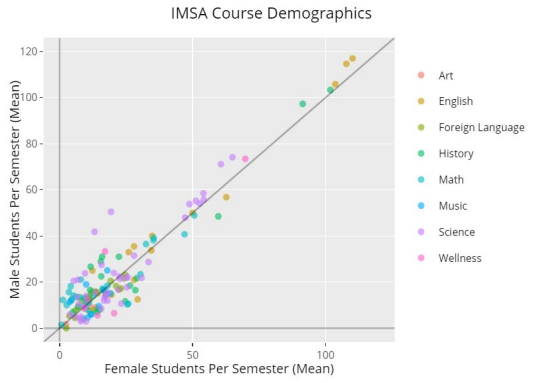
This activity will introduce students to their primary data visualization tool.

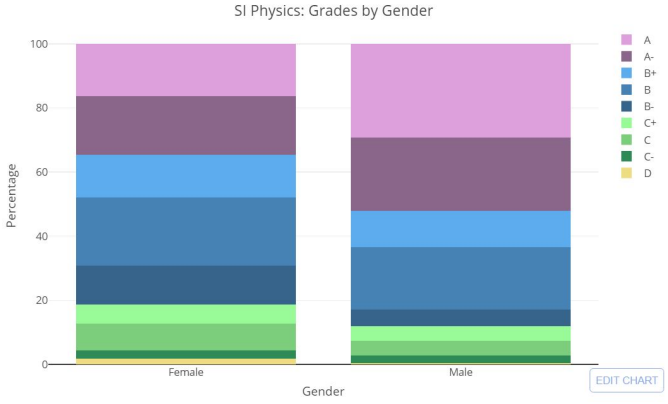
Materials:

Computers

Directions:

Show the students cool visualizations using plotly and also use Lucy's and other acronym articles as examples.
From Lucy's article:
From Shubhi's article:
https://sites.imsa.edu/acronym/2018/09/14/the-state-of-mental-health-at-imsa/
From Henry's articles:
https://sites.imsa.edu/acronym/2018/04/20/music-tastes-of-imsa/
https://sites.imsa.edu/acronym/2017/10/10/imsa-demographics-by-the-numbers/

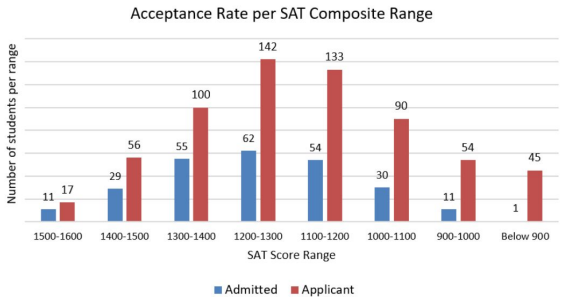


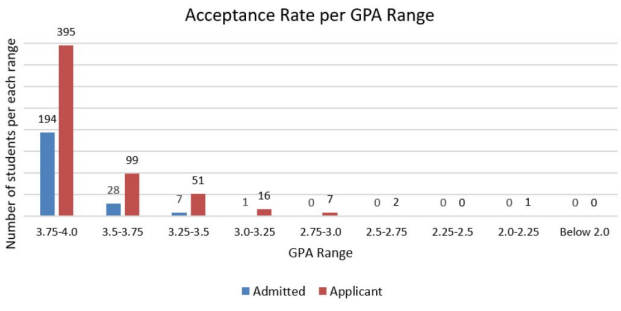


https://help.plot.ly/tutorials/ - where all the tutorials are

1. First have them create an account on the website https://help.plot.ly/how-to-sign-up-to-plotly/
2. Then go to this website to learn how to upload data to plotly https://help.plot.ly/add-data-to-the-plotly-grid/
3. Then tell them to browse the various tutorials on making simple graphs/charts https://help.plot.ly/tutorials/

Give them Lucy's data set and challenge them to make a couple of different simple visualizations. A couple examples of them are (taken from Grace Yue's Acronym post)





Discussion:

1. Do you like plotly? Why or why not?

2. What are some challenges you faced using plotly and how did you overcome them?
3. What else can plotly do besides what we've done so far?
4. What are some visualizations you would want to see that you could make with plotly?
5. What are some visualizations you would want to see that are beyond plotly's ability?

Messing Around With Advanced Plotly (30 minutes)

Purpose:

To give students time to explore the more advanced features of Plotly so they can spice up their projects.

Materials:

Computers

Directions:

Have 3-5 certain visualizations in mind (similar to the examples in summer work) for the students to complete (we're not yet sure on what these visuals will be). Have groups work together to figure each one out but have them all individually do it on their computers. Walk around and help out groups and answer questions.

https://help.plot.ly/tutorials/ - anything but the 'simple' section

Discussion:

1.

Work time (The rest of class)

Purpose:

To give them time to work on their projects and apply their newly learned data visualization skills.

Materials:

Computers

Directions:

Give students time to work on their projects. Instruct them to make plotly visualizations with their data.

Discussion:

Crowd Sourced Sophs Survey

https://goo.gl/forms/N6DFf7YH4ME8wKH62